

NASA TECH BRIEF



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Modified Blackbody Device Emits High-Density Radiation

The problem:

To calibrate radiometers used for spectrometric analysis of large rocket engine plumes, a high-energy-density (250 watts/cm²) radiant source capable of precise control was required.

The solution:

A 2-inch-aperture, 100 watt/cm² blackbody radiation source, fabricated according to U.S. Patent 3,205,343, was modified to provide the required radiation energy level.

How it's done:

The graphite heating element was removed from the assembly and replaced with a new graphite element of substantially reduced electrical cross section. The rest of the electrical system was not disturbed. Two additional concentric radiation shields, fabricated from polished tantalum sheet, were installed inside the existing shields to accommodate the higher operating temperature of the new element. Machined copper adapter plates were added to support the smaller heating element from the cooled housing. A 1-inch-diameter viewing aperture was added to the outer adapter for optical access to the radiating volume in the heater element.

The heater element is ported to permit the radiating volume and viewing aperture to be swept with an

inert gas during operation and cooldown of the heating element, as it degrades rapidly under exposure to normal atmosphere while at elevated temperature. The cooling system for the housing was left in the original configuration, as the total power level of the device remained at its original value.

Notes:

1. The modified device provides a versatile, precisely controllable source of blackbody radiation for calibration or evaluation of several types of radiometers over an extended energy-density range.
2. Inquiries concerning this device may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B67-10388

Patent status:

No patent action is contemplated by NASA.

Source: P. E. Schumacher
of North American Aviation, Inc.
under contract to
Marshall Space Flight Center

(MFS-12744)

Category 02

THE HISTORY OF THE UNITED STATES

The history of the United States is a story of a people who have built a great nation from a small colony. It is a story of the struggles and triumphs of a people who have fought for freedom and justice.

THE FOUNDING OF THE NATION

The first European settlers in North America were the Pilgrims, who came to the New World in 1620. They were followed by the Puritans, who came to the New World in 1630. The Pilgrims and the Puritans were the first of many European settlers who came to the New World.

The Pilgrims and the Puritans were the first of many European settlers who came to the New World. They were followed by the French, the Spanish, and the Dutch. The French, the Spanish, and the Dutch were the first of many European settlers who came to the New World.

The French, the Spanish, and the Dutch were the first of many European settlers who came to the New World. They were followed by the British, the German, and the Irish. The British, the German, and the Irish were the first of many European settlers who came to the New World.

The British, the German, and the Irish were the first of many European settlers who came to the New World. They were followed by the American Indians, the African Americans, and the Mexican Americans. The American Indians, the African Americans, and the Mexican Americans were the first of many people who came to the New World.

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How it's done

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